

CLAIMS

SUB A17

1. A computer-readable medium containing a data structure defining a query definition, the data structure including:
a query specification including query text and parameters, the parameters having values that may be set when the query definition is executed;
a results transform that transforms results of executing the query specification into a canonical format; and
a data source identifier that identifies a data source to be used when the query specification is executed.

2. The computer-readable medium of claim 1 wherein the results transform is an XSL transform.

3. The computer-readable medium of claim 1 wherein the data structure is represented in XML format.

4. The computer-readable medium of claim 1 wherein the data structure conforms with the following data type definition of XML:

```
<!DOCTYPE lens [  
  <!ELEMENT query (#PCDATA) REQUIRED>  
  <!ELEMENT params (param+)>  
    <!ELEMENT param (allowedvalues | props)*>  
    <!ATTLIST param name CDATA REQUIRED>  
    <!ATTLIST param value CDATA REQUIRED>  
  <!ELEMENT formats (format+) REQUIRED>  
    <!ELEMENT format (#PCDATA)>  
    <!ATTLIST format name CDATA REQUIRED>  
  <!ELEMENT serverurl (#PCDATA) REQUIRED>  
>
```

1 5. The computer-readable medium of claim 1 wherein the data structure
2 includes a name.

1 6. The computer-readable medium of claim 1 wherein the data structure
2 includes a description.

1 7. The computer-readable medium of claim 1 wherein the data structure
2 includes a version.

1 8. The computer-readable medium of claim 1 wherein the data structure
2 includes an author.

1 9. The computer-readable medium of claim 1 wherein the data structure
2 includes a date last modified.

1 10. The computer-readable medium of claim 1 wherein the data structure
2 can be used by different application programs.

1 11. A method in a computer-system for performing a query, the method
2 comprising:

3 receiving an indication of a query definition, the query definition including a
4 query specification and a results transform;

5 identifying a data source;

6 requesting execution of the query specification with the identified data source
7 to generate results in a raw format; and

8 transforming the generated results in the raw format to a canonical format.

1 12. The method of claim 11 wherein the query definition includes an
2 indication of the data source and the identifying of the data source includes retrieving the
3 indication from the query definition.

1 13. The method of claim 11 wherein the query specification includes an
2 indication of a parameter for the query specification and the method includes receiving a
3 value for the parameter wherein the requesting of the execution of the query specification
4 indicates the value of the parameter.

1 14. The method of claim 11 wherein the query specification includes an
2 indication of a parameter for the query specification and a value for the parameter.

1 15. The method of claim 14 including updating the value of the parameter
2 wherein the value is stored with the query specification.

1 16. The method of claim 11 wherein the results transform is an XSL
2 transform.

1 17. The method of claim 11 wherein the results transform includes
2 instructions for display of the generated results.

1 18. A computer-readable medium containing a data structure for
2 representing results of a query in a canonical format, the format being expressed in XML, the
3 data structure including:

4 a table element;
5 one or more row elements;
6 for each row element, one or more data elements; and
7 each data element having one or more values or table elements with row
8 elements and data elements.

1 19. The computer-readable medium of claim 18 wherein the data structure
2 is represented by the following XML format:

3
4 <!DOCTYPE FORMATTING [
5 <!ELEMENT (table)>

```

6      <![ELEMENT value #PCDATA>
7          <![ATTLIST value color CDATA>
8          <![ATTLIST value style (b|i|b|p>
9          <![ATTLIST value size CDATA>
10         <![ATTLIST value face CDATA>
11         <![ATTLIST value dynamic (true|false)>
12     <![ELEMENT table (tr*)>
13         <![ATTLIST table name CDATA #REQUIRED>
14         <![ATTLIST table border CDATA>
15         <![ATTLIST table cellpadding CDATA>
16         <![ATTLIST table cellspacing CDATA>
17         <![ATTLIST table bordercolor CDATA>
18         <![ATTLIST table valign CDATA>
19     <![ELEMENT tr(td*)>
20         <![ELEMENT td (value | table)*>
21             <![ATTLIST td id CDATA #REQUIRED>
22             <![ATTLIST td colspan CDATA>
23             <![ATTLIST td rowspan CDATA>
24             <![ATTLIST td align CDATA>
25             <![ATTLIST td valign CDATA>
26     ]>

```

20. A computer-based method for performing queries, the method comprising:

- under control of a plurality of different application programs;
- receiving an indication of a query definition, the query definition including query text and a data source identifier; and
- requesting execution of the query text with the data source to generate results

whereby the same query definition is used by the plurality of different application programs.

1 21. The method of claim 20 wherein the query definition includes a results
2 transform and including using the results transform to transform the generated results from a
3 raw format to a canonical format.

1 22. The method of claim 21 wherein the results transform is an XSL
2 transform.

1 23. The method of claim 20 including transforming the generated results
2 from a raw format to a canonical format.

1 24. The method of claim 20 wherein the query definition is a lens file.

1 25. The method of claim 20 wherein the query definition is stored in a
2 single file.

1 26. The method of claim 20 wherein the results are in a canonical format.

1 27. A computer-readable medium containing a data structure defining a
2 query definition, the data structure comprising:

3 a query specification including query text that is an expression of the query;

4 and

5 a data source identifier that identifies a data source to be used when the query
6 specification is executed

7 whereby the data structure is in a common format that can be used by a
8 plurality of different application programs to define a query that is to be executed.

1 28. The computer-readable medium of claim 27 wherein the data structure
2 further includes a results transform for transforming results of the execution of the query to a
3 canonical format.

1 29. The computer-readable medium of claim 28 wherein the results
2 transform is an XSL transform.

1 30. The computer readable medium of claim 27 wherein the data structure is
2 represented in XML format.

1 31. The computer-readable medium of claim 27 wherein the query
2 specification includes parameters having values that may be set when the query is executed.

1 32. The computer-readable medium of claim 31 wherein the query
2 specification includes possible values for the parameters.

1 33. The computer-readable medium of claim 27 wherein the query
2 specification includes sort variables for ordering of the results of the query.

1 34. The computer-readable medium of claim 27 wherein execution of the
2 query produces the same query results for each application program.

1 35. A computer-readable medium containing instructions for controlling
2 computer systems to execute queries by a method comprising:

3 receiving a query definition that includes a query specification and a data
4 source identifier, the query definition being in a format that can be accessed by a plurality of
5 different application programs; and

6 requesting execution of the query definition to generate results.

1 36. The computer-readable medium of claim 35 wherein the query
2 definition includes a results transform and including using the results transform to transform
3 the generated results from a raw format to a canonical format.

1 37. The computer-readable medium of claim 36 wherein the results
2 transform is an XSL transform.

1 38. The computer-readable medium of claim 35 including transforming the
2 generated results from a raw format to a canonical format.

1 39. The computer-readable medium of claim 35 wherein the query
2 definition is a lens file.

1 40. The computer-readable medium of claim 35 wherein the query
2 definition is stored in a single file.

1 41. The computer-readable medium of claim 35 wherein the results are in a
2 canonical format.

1 42. The computer-readable medium of claim 35 wherein the requesting of
2 execution of the query includes invoking a function of a first interface that returns a second
3 interface for retrieving the results a portion at a time.

1 43. The computer-readable medium of claim 42 wherein the first interface is
2 the ILens interface.

1 44. The computer-readable medium of claim 42 wherein the second
2 interface is the IChunks interface.

1 45. A computer system for executing queries, the computer system
2 comprising:

3 means for receiving a query definition that includes a query specification and a
4 data source identifier; and

5 means for requesting execution of the query definition to generate results.

1 46. The computer system of claim 45 wherein the query definition includes
2 a results transform and including using the results transform to transform the generated
3 results from a raw format to a canonical format.

1 47. The computer system of claim 46 wherein the results transform is an
2 XSL transform.

1 48. The computer system of claim 45 including transforming the generated
2 results from a raw format to a canonical format.

1 49. The computer system of claim 45 wherein the query definition is a lens
2 file.

1 50. The computer system of claim 45 wherein the query definition is stored
2 in a single file.

1 51. The computer system of claim 45 wherein the results are in a canonical
2 format.

1 52. A method in a computer system for generating a data structure defining
2 a query definition, the method comprising:

3 storing in the data structure a query specification including query text that is an
4 expression of the query; and

5 storing in the data structure a data source identifier that identifies a data source
6 to be used when the query definition is executed.

7 whereby the data structure is in a portable format that can be used by a
8 plurality of different application programs to execute the query definition.

1 53. The method of claim 52 including storing in the data structure a results
2 transform for transforming results of the execution of the query definition to a canonical
3 format.

1 54. The method of claim 52 including storing in the data structure
2 indications of parameters whose values may be set when the query definition is executed.

1 55. The method of claim 54 including storing in the data structure possible
2 values for the parameters.

1 56. The method of claim 54 wherein the query text may be modified before
2 execution when a value for a parameter is not specified.

1 57. The method of claim 52 including storing in the data structure sort
2 variables for controlling ordering of the results of the query.

1 58. A method in a computer system for adjusting a query expression based
2 on a parameter value not being specified at execution time, the method comprising:

3 receiving a query expression along with an indication of a parameter that may
4 be specified before executing the query expression; and

5 when the query expression is to be executed without a value of the parameter
6 being specified,

7 modifying the query expression to remove a portion of the query
8 expression that depends on the parameter; and

9 executing the modified query expression.

1 59. The method of claim 58 wherein the query expression includes query
2 sub-expressions and the modifying includes removing a query sub-expression that depends
3 on the parameter.

1 60. The method of claim 58 wherein the query sub-expressions are
2 combined by a logical-AND.

1 61. The method of claim 58 wherein the query sub-expressions are
2 combined by a logical-OR.

1 62. A computer system for adjusting a query expression based on a
2 parameter value not being specified at execution time, the computer system comprising:
3 means for receiving the query expression along with an indication of a
4 parameter, the query expression having query sub-expressions; and
5 means for modifying the query expression to remove a query sub-expression
6 that depends on the parameter when the query expression is to be executed without a value of
7 the parameter being specified; and
8 means for executing the modified query expression.

1 63. The computer system of claim 62 wherein the query sub-expressions are
2 combined by a logical-AND.

1 64. The computer system of claim 62 wherein the sub-expressions are
2 combined by a logical-OR.